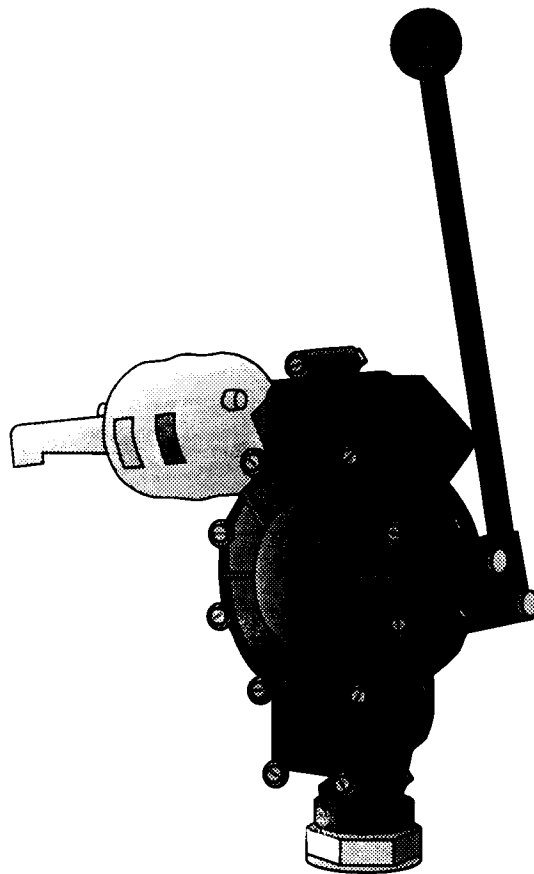


® FPUHP Series

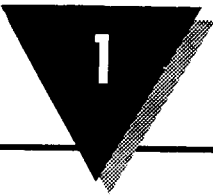
® Hand Dispensing Pumps



Operator's Manual

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Introduction

1.1 General Description

The OMEGA® FPUHP Series hand dispensing pump is a double-acting piston type which will handle a wide range of solutions. The pump body, valve seats and piston are all made of chemically resistant, performance engineered plastics, especially compounded to give the pump strength and rigidity. The pump discharges approximately one quart on every complete forward and backward cycle, and can handle viscosities up to 2000 SSU.

Standard equipment supplied is the pump and operator's manual. Additional accessories are listed in Section 1.3.

1.2 Available Models

Model No.	Body Materials	Other Materials
FPUHP11	Glass reinforced polyester	Viton O-Ring and Gasket
FPUHP12		Viton O-Ring, cork-nitrile Gasket
FPUHP13		EPDM O-Ring and Gasket
FPUHP14	Glass reinforced Ryton	Viton O-Ring and Gasket
FPUHP15		Viton O-Ring, cork-nitrile Gasket
FPUHP16		EPDM O-Ring and Gasket
FPUHP17	Halar	Viton O-Ring and Gasket
FPUHP18	(ETCTFE)	EPDM O-Ring and Gasket

1.3 Accessories

Nozzles

Model No.	Description
FPUHP1-DH1	8' EPDM, w/polyester elbow & nozzle
FPUHP1-DH2	8' Nitrile (Buna-N), w/polyester elbow & nozzle
FPUHP1-DH3	8' PVC Black Vinyl, w/polyester elbow & nozzle
FPUHP1-DH4	8' Cross linked polyethylene, w/polyester elbow & nozzle
FPUHP1-DH5	8' Cross linked polyethylene, w/Halar elbow & nozzle
FPUHP1-DH6	8' EPDM, w/Halar elbow & nozzle
FPUHP1-DH7	8' Nitrile (Buna-N), w/Halar elbow & nozzle
FPUHP1-DH8	8' PVC, w/Halar elbow & nozzle

2.1 Safety Precautions

- A. This manual contains important information for the safe and proper operation of this pump. Read it THOROUGHLY before operating or installing the pump.
- B. USE ONLY ORIGINAL FACTORY REPLACEMENT PARTS.
- C. When pumping flammable liquids, ensure adequate ventilation to prevent explosive buildup of fumes. Pumping should always be done in a "No Smoking" area. Approved fire extinguishers, in good condition, should be available for fire suppression.
- D. Containers holding flammable liquids should be grounded, and portable containers bonded, to prevent explosion hazards from static electricity charges.
- E. Operators should be properly instructed on operating procedures and safety precautions.
- F. Do not use torches or apply fire or flame to this pump for any reason.
- G. When pumping corrosives, provide personal protection such as rubber gloves, aprons, eye shields, and adequate ventilation. Consult chemical manufacturer for additional cautions.
- H. **Do not overtighten nonmetallic threaded fittings. One full turn past hand tight is usually enough to prevent leakage.** One roll of Teflon tape is provided and should be used on all threaded joints.
- I. Inspect the siphon breaker regularly to ensure proper operation. To test siphon breaker, lay hose on ground with nozzle in a suitable container to hold the liquid. Operate the handle until liquid flows from the nozzle. Stop pumping; the hose should drain and the flow stop. If flow continues without moving the handle, place the nozzle in its hanger to stop the flow. Then inspect siphon breaker vent for blocking or freezing. Flush the vent with fresh water, or if pumping petroleum products, use clean product.

TO PREVENT SPILLING LIQUID WHEN REMOVING PUMP FROM BARREL, OBSERVE THE FOLLOWING PRECAUTIONS:

- 1. Straighten discharge hose and hold it below the pump discharge. Allow hose to drain into a container.
- 2. Loosen stainless steel clamp item #31.
- 3. Pull pump from bung adapter and allow suction tube to drain back to the barrel. Lay pump flat with handle up. Place container under nozzle. Operate handle until liquid is cleared from pump housing.
- 4. Allow discharge hose to drain. Place the hose nozzle in its hanger. If pump will not be installed in a new barrel, any caustic or corrosive chemicals should be flushed with fresh water internally and externally to prevent personal injury during handling. **ANY PUMP USED TO TRANSFER FLAMMABLE LIQUIDS MUST BE STORED IN A WELL VENTILATED AREA AFTER USE.**



1.3 Accessories (Continued)

Filter Capsule - Pac

Model No.	Description	Micron
FPUHP1-FC1	Polypropylene filter capsule with pleated 1.3 sq. ft. polypropylene media, Halar pump adapter, Halar discharge spout	1.0 Nominal
FPUHP1-FC2		0.2 Nominal
FPUHP1-FC1R	Replacement filter capsule	1.0 Nominal
FPUHP1-FC2R		0.2 Nominal

Suction Tube

Model No.	Description
FPUHP1-ST1	2 pc. 1" polyester, 34" long w/polyester coupling & TFE tape
FPUHP1-ST2	2 pc. 1" TFE, 34" long w/Halar coupling & TFE tape
FPUHP1-ST3	2 pc. 1" UHMW Polyethylene*, 34" long w/Halar coupling & TFE tape
FPUHP1-ST4	1 pc. 3/4" PVC flexible, 35" long (prevents tearing of drum liner)
FPUHP1-ST5	2 pc. 3/4" polyethylene, telescoping 18"-35" length w/Viton O-ring

*Ultra-High Molecular Weight Polyethylene

Buttress-Bung Adapter (2" Buttress x 2" NPT)

Model No.	Description
FPUHP1-BA1	Polypropylene/polyester assembly for HP pump
FPUHP1-BA2	Polypropylene/Halar assembly for HR pump
FPUHP1-BA3	Polypropylene/Halar assembly for HH pump

Discharge Spout

Model No.	Description
FPUHP1-DS1	Polyester discharge spout
FPUHP1-DS2	Halar discharge spout

2.2 General Safety Information for Handling Flammable and Combustible Liquids

WARNING

When using a hand pump to fill cans, drums, or other portable or fixed containers with flammable or combustible liquids such as gasoline, both the container being pumped from and the container being pumped to must be effectively *BONDED* and *GROUNDING* to prevent discharge of sparks of static electricity which could cause explosion.

BONDING is the electrical interconnection between containers (such as a drum and a receiving can). Bonding must be completed before pumping begins. See Figure 2-1.

GROUNDING is the electrical connection between the container and a "constant ground". A "constant ground" would be a metal pipe or rod in contact with the earth. An underground tank and piping connected to it would be inherently grounded by nature of the installation. See Figure 2-1.

Both *BONDING* and *GROUNDING* of containers of flammable liquids are required under U.S. Gov't. OSHA regulations and National Fire Protection Association Code 77, Static Electricity.

Consult OMEGA for specific liquid handling recommendations.

High quality *BONDING* and *GROUNDING* wires are available from OMEGA. Order FPUHP-GW grounding/bond wire.

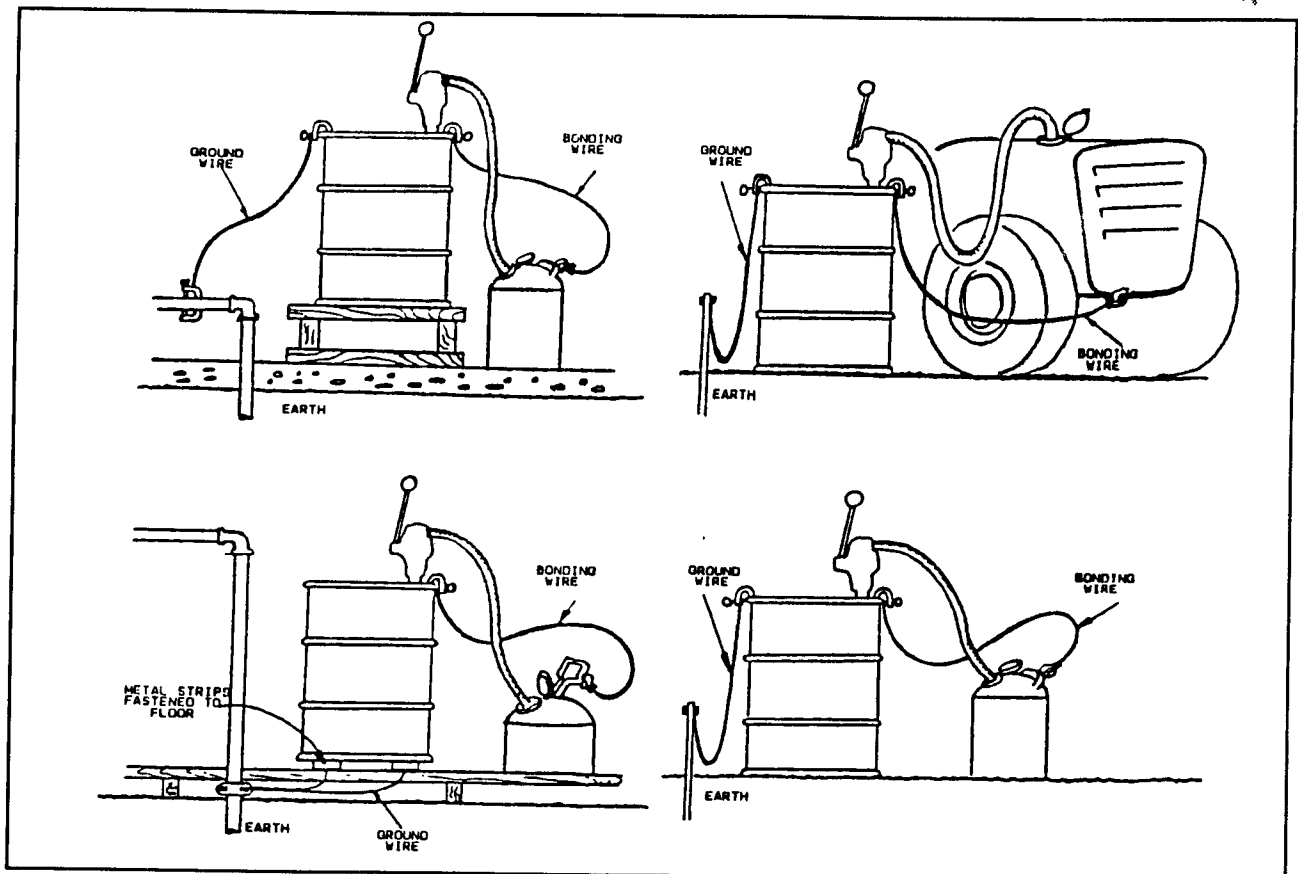


Figure 2-1. Examples of Bonding and Grounding

2.3 Unpacking

Remove the Packing List and verify that you have received all equipment. If you have any questions about the shipment, please call the OMEGA Customer Service Department at 1-800-622-2378 or (203) 359-1660.

When you receive the shipment, inspect the container and equipment for any signs of damage. Note any evidence of rough handling in transit. Immediately report any damage to the shipping agent

NOTE

The carrier will not honor any claims unless all shipping material is saved for their examination. After examining and removing contents, save packing material and carton in the event reshipment is necessary.

The following equipment is packed in the box:

- FPUHP Series Pump
- Operator's Manual

Additional accessories are listed in Section 1.3.

2.4 Installation

- A. If you have not checked the chemical compatibility of your pump with the liquid, *do it now before using the pump!* Consult OMEGA for any chemical applications. A corrosion resistance chart is included in Section 7.
- B. The pump handle can be easily positioned either up for normal use, or down, allowing the pump to be elevated. This would be convenient for example when pumping from a truck-mounted drum or barrel. See Section 3.
- C. A siphon breaker is built into the pump discharge. This prevents siphoning the drum if the hose drops from its hanger. It also allows the hose to drain completely after pumping.
- D. The barrel is vented by four relief channels molded into the bung adapter. This prevents drawing a vacuum in the barrel.
- E. The suction tube (#36) and extension tube (#34) supplied are cut to fit a standard 55 gallon drum. The suction tube has a bevel cut at one end and is threaded at the other end. The extension tubes are threaded at both ends. Extra extension tubes (#34) and couplings (#35) may easily be used for deeper vessels such as tanks. Maximum suction lift is 15 feet.
 1. A 55 gallon drum on end requires 1 extension tube, 1 coupling, and 1 suction tube, threaded together.

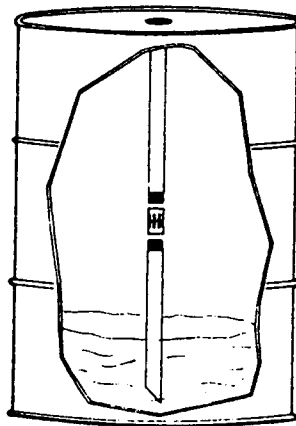


Figure 2-2. Drum with Extension Tubes

2. To use the side bung hole on a 55 gallon drum, thread together one extension tube, one coupling, and a 5" length of suction tube. The plastic tube can easily be cut with a hacksaw. Make the cut at an angle. **DO NOT CUT THE THREADED END.**
3. For 275 gallon tanks, thread together two extension tubes and one suction tube.

For easy installation follow these steps in the order shown.

- A. Screw the bung adapter into the drum or barrel. Be sure not to overtighten.
- B. Install supplied clamp loosely around bung adapter.
- C. Thread appropriate length of suction tube and extension tube(s) into pump suction. Use the Teflon tape provided.
- D. Install pump and tubing into bung adapter by pushing straight down firmly. Housing will snap in place. Tighten the clamp (item #31). Screw hose and adapter or discharge spout into pump body.

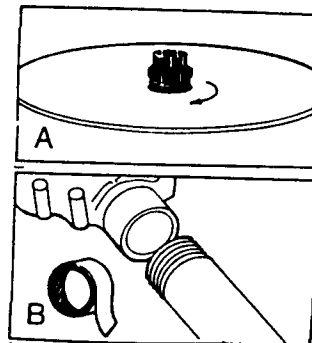


Figure 3-1. Installing Adapter and Clamp

- E. When pumping from a lined drum, order part #58-0069. This is a flexible suction tube and will prevent damage to the liner.
- F. The handle position can be changed with the following steps. Refer to Figure 3-2.
 1. Remove hairpin clip from clevis pin.
 2. Remove clevis pin from housing to free links.
 3. With links clear of housing, rotate handle $\frac{1}{2}$ turn to new position.
 4. Install clevis pin through the links and the opposite hole in housing.
 5. Install hairpin clip through the hole in the clevis pin. Ensure the flat washer (4) is installed between the hairpin clip and the link.

6. This hole used for security lock only.

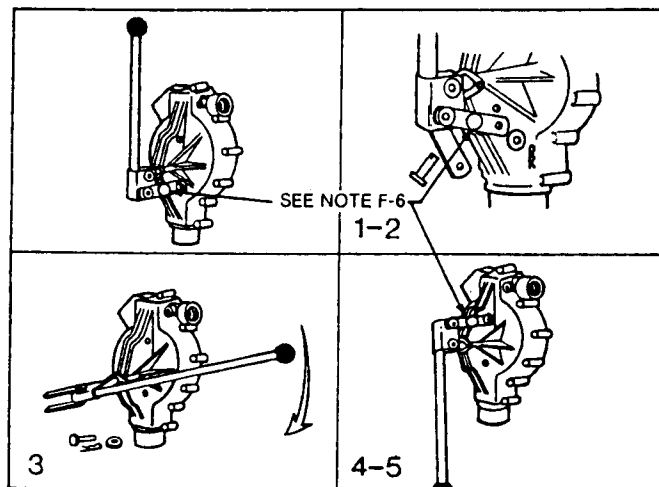


Figure 3-2. Two-Position Pump Handle

- G. Remove hose from hanger, and place nozzle in container. Operate handle to prime the pump. Three to six strokes are required under most conditions. After the pump is primed, it will deliver about one gallon for every four full strokes (backward and forward).

A. Pump Will Not Prime

1. Clogged Suction. Check that suction tubes are clear and that screen filter is not dirty or clogged. Use a pair of needle-nose pliers or a stiff piece of wire to pull suction screen from housing. Clean if necessary, and push gently back into housing with a finger or blunt rod.
2. Air Leakage. Check that the connections to housing, extension tube, and suction tube, are threaded tightly and sealed with Teflon tape.
3. Piston Leakage. Verify that Teflon ring fits snugly in bore and is not cut or excessively worn.
4. Valve Leakage. Inspect poppet valves for weak springs or clogging. If pump was recently disassembled, VERIFY PROPER POSITION OF VALVE SEATS. Refer to Section 5.2.
5. Gasket Leakage. Inspect for torn gasket (#18), poor fit, or loose coverplate bolts (#20).

B. Not Enough Flow

1. Check items A. 1-5 above. Check discharge hose for clogging or pinching. Verify that nozzle is not clogged.
2. Check that piston is traveling its full stroke, and the linkage has not bound or jammed.



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5.1 Disassembly

1. Remove hose (#17) from housing. Unscrew suction and/or extension tubes (#34 & #36).
2. Remove hex nuts (#22) and screws (#20) from housing. Remove cover plate and gasket (#19 & #18), being careful not to damage the gasket.
3. Remove large and small valve assemblies (#24 and #23) and inspect for broken or weak springs, or damaged or clogged valves.
4. Remove hairpin clip (#5), washer (#4) and clevis pin (#3) which hold handle (#2) to the piston rod. Remove hairpin clip (#6), flat washer (#4), and clevis pin (#7) from links (#8) at the pump housing (#37).

Remove pin (#3) from piston rod and set handle aside. Slide piston assembly (#28) from the housing.

5. Inspect Teflon ring (#30) in piston groove. It must extend about $\frac{1}{32}$ " above the edge of the piston to seal properly. If the ring has worn flush with the piston edge, it must be replaced.

When removing the Teflon ring be careful not to damage the piston if tools are being used.

Always replace the o-ring (#29) when replacing the Teflon ring. The rubber o-ring is compressed over time, reducing its ability to seal.

6. Inspect piston bore in housing (#37) for wear. Any gouging or scraping would indicate that the liquid being pumped contains abrasives. Replace the housing and Teflon ring if the surfaces are gouged or worn.
7. Remove the two screws (#9) that hold retaining plate (#10) to the housing. Remove plate to expose piston rod o-ring (#11). Replace o-ring if worn.

5.2 Reassembly

1. Install the two small valve assemblies (#23) in the housing first, then the two large assemblies (#24). There is a small tab molded into the valve seats which fits a guide channel in the housing. This prevents installing the valve seats backwards. If the tabs are broken, please note the following.
 - a. The suction valve seats (lower two) should have their springs facing each other when installed.
 - b. The discharge valve seats (upper two) should have springs facing away from each other.
2. Install piston rod o-ring (#11). Install retainer plate (#10) with the groove facing away from the pump housing. Ensure piston (#28) has o-ring (#29) and Teflon ring (#30) installed. Teflon ring will stretch enough to install by hand (tools may damage the piston). Slide piston rod into housing.

The Teflon ring will catch on the edge of the housing while pushing the piston into the bore. To help seat the ring, turn piston slowly while pushing ring into the groove with fingers. **DO NOT FORCE PISTON.**

3. Inspect the cover plate gasket (#18) for damage.
4. Lay coverplate and gasket on housing and install screws (#20) and hex nuts (#22). Tighten firmly enough to compress the gasket.
5. Install short clevis pin (#3) through the piston rod and handle, securing with washer (#4) and hairpin clip (#5). Install clevis pin (#7), flat washer (#4) and links (#8) at the pump housing.
6. Install hose, and suction and extension tubes as required. Refer to Section 2.3.

ITEM NO.	PART NO.	DESCRIPTION	QTY.
1	58-1049 40	KNOB, Polypropylene	1
2	58-1050 01	HANDLE, Assembly, Includes Item 1	1
3	58-1053	PIN, Clevis, $\frac{5}{16}$ " \times $1\frac{1}{4}$ ", Plated Steel	1
4	58-1380 90	WASHER, Flat, Nylon	4
5	58-1379	CLIP, Hairpin, Plated Steel, Small	2
6	58-1027	CLIP, Hairpin, Plated Steel, Large	1
7	58-1031	PIN, CLEVIS, $\frac{5}{16}$ " \times $1\frac{1}{4}$ ", Plated Steel	2
8	58-1052	LINK, Plated Steel	2
9	58-1348 10	SCREW #10-14 \times $\frac{3}{4}$ ", Stainless Steel	2
10	58-1032 30	PLATE, Retaining, Polyester	1
	58-1032 90	PLATE, Retaining, Fluoropolymer	1
11	58-1030 72	O-RING, Piston Rod, EPDM	1
	58-1030 73	O-RING, Piston Rod, Viton	1
14	58-1040 72	VACUUM BREAKER, EPDM	1
	58-1040 73	VACUUM BREAKER, Viton	1
15	58-1325 30	NOZZLE, No-lead, Polyester	1
	58-1325 90	NOZZLE, No-lead, Fluoropolymer	1
16	58-1044 12	CLAMP, Hose, Crimped, Stainless Steel	2
17	58-1342 02	HOSE, Discharge Assembly, Black PVC with Polyester Nozzle and Fitting	1
	58-1342 92	HOSE, Discharge Assembly, Black PVC with Fluoropolymer Nozzle and Fitting	1
	58-1342 04	HOSE, Discharge Assembly, Black Nitrile with Polyester Nozzle and Fitting	1
	58-1342 94	HOSE, Discharge Assembly, Black Nitrile with Fluoropolymer Nozzle and Fitting	1
	58-1342 05	HOSE, Discharge Assembly, Red EPDM with Polyester Nozzle and Fitting	1
	58-1342 95	HOSE, Discharge Assembly, Red EPDM with Fluoropolymer Nozzle and Fitting	1
	58-1342 07	HOSE, Discharge Assembly, Cross-linked Polyethylene with Polyester Nozzle and Fitting	1
	58-1342 97	HOSE, Discharge Assembly, Cross-linked Polyethylene with Fluoropolymer Nozzle and Fitting	1
18	58-1204 72	GASKET, Coverplate, EPDM	1
	58-1204 73	GASKET, Coverplate, Viton	1
	58-1204 90	GASKET, Coverplate, Cork-Nitrile	1
19	58-1209 30A	COVERPLATE, Polyester, Red	1
	58-1209 60	COVERPLATE, Ryton, Black	1
	58-1209 90	COVERPLATE, Fluoropolymer	1
20	58-1206	SCREW, $\frac{1}{4}$ -20 \times 2" Slotted Hex Washer Head, Plated Steel	11
	58-1206 10	SCREW, $\frac{1}{4}$ -20 \times 2" Slotted Hex Washer Head, Stainless Steel	11

ITEM NO.	PART NO.	DESCRIPTION	QTY.
21	58-1214 30	ADAPTER, Hose, Polyester 3/4" MNPT x 3/4" Hose Barb 60° Elbow	1
	58-1214 90	ADAPTER, Hose, Fluoropolymer 3/4" MNPT x 3/4" Hose Barb 60° Elbow	1
22	58-0721	NUT, Hex, 1/4-20, Plated Steel	11
	58-0721 10	NUT, Hex, 1/4-20, Stainless Steel	11
23	58-1340 02	VALVE ASSEMBLY, Small, Polyester, EPDM	2
	58-1340 03	VALVE ASSEMBLY, Small, Polyester, Viton	2
	58-1340 92	VALVE ASSEMBLY, Small, Fluoropolymer, EPDM	2
	58-1340 93	VALVE ASSEMBLY, Small, Fluoropolymer, Viton	2
24	58-1341 02	VALVE ASSEMBLY, Large, Polyester, EPDM	2
	58-1341 03	VALVE ASSEMBLY, Large, Polyester, Viton	2
	58-1341 92	VALVE ASSEMBLY, Large, Fluoropolymer, EPDM	2
	58-1341 93	VALVE ASSEMBLY, Large, Fluoropolymer, Viton	2
26	58-1038 10	SCREEN, Filter, Stainless Steel	1
28	58-1338 02	PISTON ASSEMBLY, Teflon ring, Polyester, EPDM O-ring	1
	58-1338 03	PISTON ASSEMBLY, Teflon ring, Polyester, Viton O-ring	1
	58-1338 92	PISTON ASSEMBLY, Teflon ring, Fluoropolymer, EPDM O-ring	1
	58-1338 93	PISTON ASSEMBLY, Teflon ring, Fluoropolymer, Viton O-ring	1
29	58-1029 72	O-RING, Piston EPDM	1
	58-1029 73	O-RING, Piston, Viton	1
30	58-1028 90	RING, Piston, Teflon, for Polyester Pumps	1
	58-2024 90	RING, Piston, Teflon, for Ryton and Fluoropolymer Pumps	1
31	58-1056 10	CLAMP, Bung Adapter, Stainless Steel	1
32	58-1043 01	ADAPTER, Bung, Assembly, Polyester with Cork-Nitrile Gasket	1
	58-1201 91	ADAPTER, Bung, Assembly, Fluoropolymer with Buna-N O-ring	1
	58-1201 92	ADAPTER, Bung, Assembly, Fluoropolymer with EPDM O-ring	1
	58-1201 93	ADAPTER, Bung, Assembly, Fluoropolymer with Viton O-ring	1
	58-0031 P	ADAPTER, Buttress/Bung, Assembly, Polypropylene/Polyester, 2" Buttress x 2" NPT, for Polyester Pumps	1
	58-0031 R	ADAPTER, Buttress/Bung, Assembly, Polypropylene/Fluoropolymer, 2" Buttress x 2" NPT for Ryton Pumps	1
	58-0031 H	ADAPTER, Buttress/Bung, Assembly, Polypropylene/Fluoropolymer, 2" Buttress x 2" NPT, for Halar Pumps	1
33	58-1381 90	GASKET, Bung Adapter, Cork-Nitrile	1
	58-1822 71	O-RING, Bung Adapter, Buna-N	1
	58-1822 72	O-RING, Bung Adapter, EPDM	1
	58-1822 73	O-RING, Bung Adapter, Viton	1
34	58-1007 30	TUBE, Extension 16 1/2" Long, Polyester	1
	58-1007 50	TUBE, Extension, 16 1/2" Long, UHMW-PE	1
	58-1007 90	TUBE, Extension, 16 1/2" Long, Teflon	1
35	58-1055 30	COUPLING, 1" NPT, Polyester	1
	58-1055 90	COUPLING, 1" NPT, Fluoropolymer	1

ITEM			
NO.	PART NO.	DESCRIPTION	QTY.
36	58-1045 30	TUBE, Suction, 16½" Long (for 55 Gal. Drum) Polyester	1
	58-1045 50	TUBE, Suction, 16½" Long (for 55 Gal. Drum), UHMW-PE	1
	58-2029 30	TUBE, Suction, 10¼" Long (for 30 Gal. Drum), Polyester	1
	58-1045 90	TUBE, Suction, 16½" Long (for 55 Gal. Drum), Teflon	1
	58-0069	TUBE, Suction Flexible, 35" Long, PVC (not shown)	1
	59-0183	TUBE, Suction, Telescoping, Polyethylene 18"-35" Long (not shown)	1
37	58-1022 30A	HOUSING, Polyester, Red	1
	58-1022 60	HOUSING, Ryton, Black	1
	58-1022 90	HOUSING, Fluoropolymer	1
38	58-2022 30	PLUG, Vent, Polyester	1
	58-2022 90	PLUG, Vent, Fluoropolymer	1
39	58-2020 30	SPOUT, Polyester	1
	58-2020 90	SPOUT, Fluoropolymer	1

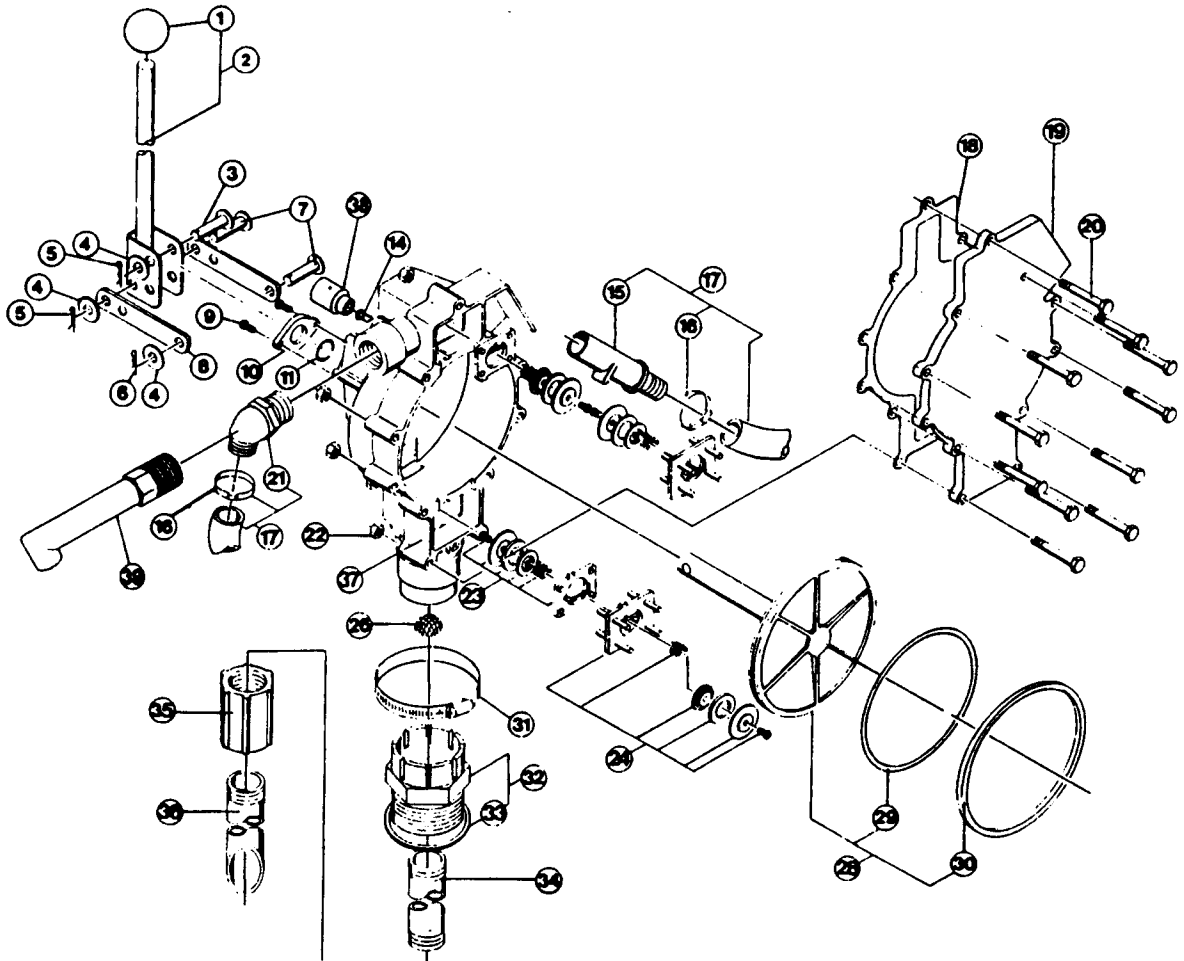


Figure 6-1. Exploded View

Key to product symbols used in chart heading:

- A Bung Adapter
- B Bearing housing (on pedestal model centrifugal pumps), adapter plate (between pump & electric motor on centrifugal pumps close coupled to electric motors)
- D Piston
- E Elbow and Nozzle for Hose Assembly on Hand Pump
- F Fasteners, wetted ('pins' in the quick connect couplings)
- G Gasket
- H Housing
- I Impeller
- O O-rings, check valve, shaft seal bellows
- R Piston rod (in the hand pump), pump shaft sleeve (in the centrifugal pumps)
- S Shaft seal
- T Suction tube
- U Discharge Hose
- V Volute
- X Indicates that entire part is constructed of that material

MATERIALS

A — Recommended
 C — Not recommended
 X — Insufficient data
 F — Consult factory

SEE KEY ON PAGE 1 FOR PRODUCT SYMBOL IDENTIFICATION

PRODUCT

	PLASTICS			ELASTOMERS				METALS			MECHANICAL SEALS									
	Ryton (FRP)**	Polyester (FRP)**	Polypropylene (FRP)**	Noryl (FRP)**	HDPE (High density polyethylene)	PVC	HALAR	UHMW Polyethylene	Buna-N	EPDM	Mion	Cork-Nitrile	Hastelloy C	Titanium	316 Stainless Steel	Carbon	Ceramic	Siliconized Graphite		
SELF-PRIMING CENTRIFUGAL	H,I,V	H,I,V	H,I		B					O	O	O		S,F	F,R	S,F,R	S	S	S	
END-SUCTION CENTRIFUGAL		H,I,V			H,I,V						O	O	O		S,F	F,R	S,F,R	S	S	S
HAND PUMP	H	HTD AE					T,U	ADE H	U	T		OG	OG	G			R,F			
QUICK CONNECT COUPLINGS		H										G	G	G			F			
ELBOWS		X																		
STRAINERS					X			X												
PLASTIC PIPE NIPPLES							X													

CHEMICAL

ACETALDEHYDE	A	A	C	C	X	C	A	A	A	C	A	A	C	C	X	A	A	A	A	A
ACETIC ACID, 20%	A	A	C	C	A	A	A	A	A	C	A	A	C	C	X	A	A	A	A	A
ACETIC ACID, 50%	A	A	C	C	X	A	A	A	A	C	A	A	C	C	X	A	A	A	A	A
ACETIC ACID, Glacial	A	C	X	C	C	C	C	A	X	A	A	C	C	C	X	A	A	A	A	A
ACETIC ANHYDRIDE	A	C	A	C	C	C	C	A	X	A	A	C	C	C	X	A	A	A	A	A
ACETONE	A	C	A	A	X	C	C	A	A	A	A	C	C	C	X	A	A	A	A	A
ALCOHOL, AMYL	A	A	C	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
ALCOHOL, ETHYL	A	A	A	X	A	X	A	A	A	A	A	A	A	A	A	X	A	A	A	A
ALCOHOL, ISOPROPYL	A	C	A	X	A	A	A	A	A	A	C	A	A	A	C	A	A	A	A	A
ALCOHOL, METHYL	A	A	A	A	X	A	A	A	A	A	A	C	A	A	A	A	A	A	A	A
ALCOHOL, PROPYL	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
ALUMINUM CHLORIDE	A	C	A	A	A	A	A	A	A	A	A	A	A	A	A	A	C	A	A	A
ALUMINUM FLUORIDE	A	C	X	A	A	A	A	A	A	A	A	A	A	A	A	C	A	A	X	A
ALUMINUM SULFATE	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
AMMONIA, 30% (cold)	A	C	A	A	A	A	A	A	A	A	A	A	C	A	A	A	A	A	A	A
AMMONIUM CHLORIDE	A	A	A	A	A	A	A	A	A	A	A	A	A	C	A	A	A	A	A	A
AMMONIUM HYDROXIDE *NOTE 1*	A	C	A	A	A	A	A	A	A	A	C	A	A	C	A	A	A	C	A	A
AMMONIUM NITRATE	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
AMMONIUM PERSULFATE	A	A	X	A	A	A	A	A	A	A	C	A	A	X	A	X	A	A	A	A
AMMONIUM PHOSPHATE	A	A	X	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
AMMONIUM SULFATE	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
AMYL ACETATE	A	A	C	C	C	C	C	A	A	A	C	A	C	X	A	A	A	A	A	A
AMYL CHLORIDE	A	A	X	C	C	C	C	A	C	A	X	X	A	C	X	A	A	A	A	A
ANILINE	A	C	A	C	C	C	C	A	A	A	C	X	A	C	X	A	A	A	A	A
AQUA REGIA	X	C	X	C	C	C	C	A	X	C	C	X	A	X	A	A	C	C	A	C
ARSENIC ACID	A	C	X	A	A	A	A	A	A	A	A	A	A	A	X	A	A	A	A	A
BARIUM CHLORIDE	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	X	A	A	A	A
BARIUM SULFATE	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
BEER	A	A	A	A	A	A	A	A	A	A	A	C	A	A	X	A	A	A	A	A
BENZALDEHYDE	C	A	A	C	C	C	C	A	X	C	C	A	C	X	A	A	A	A	A	A
BENZENE (BENZOL)	A	A	C	C	C	C	C	A	A	A	A	C	C	X	A	A	A	A	A	A
BENZOIC ACID	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
BORAX (SODIUM BORATE)	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	X	A	A	A	A
BORIC ACID	A	A	X	A	A	A	A	A	A	A	A	A	A	A	A	A	A	X	A	A
BROMINE WATER	C	C	C	C	C	C	C	A	A	A	C	C	A	A	X	A	A	C	C	A
BUTYL ACETATE	A	A	A	C	C	C	C	A	A	A	X	A	C	X	A	A	A	A	A	A
BUTYRIC ACID	A	C	X	C	A	A	A	A	A	A	C	A	A	X	A	A	A	A	A	A
CALCIUM BISULFITE	A	C	X	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
CALCIUM CHLORIDE	A	A	A	A	A	A	A	A	A	A	A	A	C	A	A	A	A	A	A	A
CALCIUM HYPOCHLORITE 20%	A	A	X	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
CALCIUM SULFATE	A	A	A	A	A	A	A	A	A	A	A	A	X	A	A	A	A	A	A	A
CARBON TETRACHLORIDE	A	A	C	C	C	A	A	A	A	A	C	C	A	A	A	A	A	A	A	A
CARBONIC ACID	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
CHLOROACETIC ACID	A	C	X	C	C	A	A	A	A	A	A	X	A	C	X	A	A	C	A	A
CHLORINE WATER	C	C	X	A	A	A	A	A	A	A	C	A	A	A	A	A	C	A	A	A

Note 1: aqua ammonia

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MATERIALS

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PRODUCT

	PLASTICS				ELASTOMERS				METALS			MECHANICAL SEALS										
	Ryton (FRP)**	Polyester (FRP)**	Polypropylene (FRP)**	Noryl (FRP)**	HDPE (High density polyethylene)	PVC	HALAR	Cross Linked polyethylene	UHMW Polyethylene	Buna-N	EPDM	Viton	Cork-Nitrile	Hastelloy C	Titanium	316 Stainless Steel	Carbon	Ceramic	Siliconized Graphite			
SELF-PRIMING CENTRIFUGAL	H.I.V	H.I.V	H.I				B				O	O	O		S.F	F.R	S.F.R	S	S	S		
END-SUCTION CENTRIFUGAL		H.I.V					H.I.V							O	O	O	S.F	F.R	S.F.R	S	S	S
HAND PUMP	H	HTD AE						T,U	ADE H	U	T		OG	OG	G			R,F				
QUICK CONNECT COUPLINGS			H										G	G	G			F				
ELBOWS			X																			
STRAINERS				X				X														
PLASTIC PIPE NIPPLES								X														

CHEMICAL

CHLOROBENZENE	A	C	C	C	C	C	A	A	A	C	C	A	X	A	X	A	A	A	A	A
CHLOROFORM (WET)	A	C	C	C	C	C	A	A	A	C	C	A	X	A	A	A	A	A	A	A
CHLOROSULFONIC ACID	C	C	A	C	X	A	A	A	A	C	C	C	C	A	C	A	A	C	A	A
CHROMIC ACID, 10%	A	C	A	A	A	A	A	A	A	C	C	C	A	C	A	A	A	A	A	A
CHROMIC ACID, 50%	A	C	A	A	C	A	A	A	A	C	C	C	A	C	A	A	A	A	A	A
CHROMIC ACID, 80%	A	C	A	A	C	C	A	A	A	C	C	C	A	C	A	A	C	A	A	A
CITRIC ACID	A	A	A	A	A	A	A	A	A	C	A	A	A	A	A	A	A	A	A	A
COPPER CHLORIDE	X	C	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
COPPER CYANIDE	A	C	A	A	A	A	A	X	A	A	A	A	A	A	A	A	A	A	A	A
COPPER NITRATE	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
COPPER SULFATE	A	A	A	A	A	A	A	A	A	A	X	A	A	A	A	A	A	A	A	A
CRESYLIC ACID	X	A	C	C	X	A	A	A	A	A	C	A	A	A	A	A	A	A	A	A
ETHYL ACETATE	A	A	A	C	C	C	A	A	A	X	A	C	C	C	A	X	A	A	A	A
ETHYL CHLORIDE	A	C	C	C	C	C	A	A	A	A	A	A	A	A	A	A	A	A	A	A
ETHYLENE GLYCOL	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	X	A	A	A	A
FATTY ACIDS	X	A	A	A	A	A	A	A	A	A	C	A	A	A	A	A	A	A	A	A
FERRIC CHLORIDE	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	C	C	A
FERRIC NITRATE	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
FERRIC SULFATE	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
FERROUS CHLORIDE	A	A	A	A	A	A	A	A	A	X	A	A	A	A	A	A	C	A	A	A
FERROUS SULFATE	A	A	A	A	A	A	A	A	A	X	A	A	A	X	A	A	A	A	A	A
FLUOBORIC ACID	A	A	A	A	A	A	A	X	A	A	A	A	A	A	A	C	C	A	A	A
FLUOSILICIC ACID	A	X	A	A	A	A	A	X	A	A	A	A	A	A	A	C	A	A	C	A
FORMALDEHYDE, 40%	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
FORMIC ACID	A	C	A	A	A	A	A	A	A	A	A	C	A	A	A	A	A	A	A	A
FREON 11 (REFR.)	A	A	C	A	C	C	A	C	A	C	A	A	A	A	A	X	X	C	A	A
FREON 12 (Wet)	A	A	A	A	C	A	C	A	C	A	A	A	A	A	X	X	C	A	A	A
FREON 22 (REFR.)	A	A	C	A	C	C	A	C	A	C	C	C	C	C	X	X	A	A	A	A
FREON 113 (REFR.)	A	A	C	A	C	C	A	A	A	A	C	C	F	A	A	A	A	A	A	A
FREON TF (SOLV)	A	A	C	A	C	C	A	A	A	A	A	C	F	A	A	A	A	A	A	A
FREON TMC (SOLV)	A	C	C	X	C	C	A	C	C	C	C	C	A	C	A	X	A	A	A	A
FUEL OILS	A	A	C	C	C	C	A	A	A	A	C	A	A	A	A	A	A	A	A	A
FURFURAL	A	A	C	C	C	C	A	A	A	A	C	A	C	X	A	X	A	A	A	A
GASOLINE	A	A	C	C	C	A	A	A	A	A	C	A	A	A	A	C	A	A	A	A
GLYCERINE (GLYCEROL)	A	A	A	A	C	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
HEPTANE	A	A	C	C	C	A	A	A	A	A	A	C	A	A	A	X	A	A	A	A
HEXANE	A	A	C	X	C	A	A	A	C	A	C	A	A	A	A	X	A	A	A	A
HYDROBROMIC ACID, 50%	A	C	A	A	A	A	A	A	A	A	A	A	A	A	A	A	C	A	A	A
HYDROCHLORIC ACID, 0-20%	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	C	C	A	A	A
HYDROCHLORIC ACID, 20+	A	C	A	A	A	A	A	A	A	A	C	A	A	A	A	C	C	A	A	A
HYDROCYANIC ACID	X	C	A	A	A	A	A	A	A	A	C	A	A	C	A	C	C	A	A	A
HYDROFLUORIC ACID, 10%	C	C	C	A	C	A	A	A	A	X	X	A	X	A	X	C	C	C	C	A
HYDROFLUORIC ACID, 30%	C	C	C	A	C	A	A	A	A	C	A	A	A	A	X	C	C	C	C	A
HYDROFLUORIC ACID, 60%	C	C	C	C	C	A	A	A	A	C	A	A	A	X	A	C	C	C	C	A
HYDROFLUOSILICIC ACID 20%	A	C	A	C	A	A	A	A	A	A	A	A	A	A	A	C	A	X	C	A

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PRODUCT

- SELF-PRIMING CENTRIFUGAL
- END-SUCTION CENTRIFUGAL
- HAND PUMP
- QUICK CONNECT COUPLINGS
- ELBOWS
- STRAINERS
- PLASTIC PIPE NIPPLES

PLASTICS	ELASTOMERS	METALS	MECHANICAL SEALS
RYTON (FRP)** Polyester (FRP)** Polypropylene (FRP)** HDPE (High density polyethylene) Noryl (FRP)** PVC HALAR	UHMW Polyethylene Buna-N EPDM Viton Cork-Nitrile	316 Stainless Steel Titanium Hastelloy C	Carbon Ceramic Siliconized Graphite
H,I,V H,I,V H,I	B	O O O	S,F F,R S,F,R S S S
H,I,V	H,I,V	O O O	S,F F,R S,F,R S S S
H HTD AE	T,U ADE H	U T U U,OG OG G	R,F
H		G G G	F
X			
	X X		
	X		

CHEMICAL

HYDROGEN PEROXIDE, 30%	A*	A*	A	A	X	A	A	A	A	C	X	A	A	A	A	A	A*	A	X	A
HYDROGEN PEROXIDE, 50%	C	C	X	A	X	A*	A	A	A	A	A	A	A	A	A	X	A*	A	X	A
HYDROGEN PEROXIDE, 90%	X	C	X	A	X	C	A	A	A	C	A	A*	A	A	A	X	A*	A	X	A
HYDROGEN SULFIDE, AQ. SOL.	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
IODINE (In Alcohol)	C	C	A*	C	A	A	A	A	A	C	A	C	A	A	A	C	A	A	X	A
KEROSENE	A	A	C	C	C	A	A	A	A	C	A	C	A	A	A	A	A	A	A	A
KETONES	A	A	A*	X	C	C	A	X	C	C	A	C	X	A	A	A	A	A	A	A
LACQUER THINNERS	X	C	C	X	C	C	A	A*	C	C	A	C	C	A	A	A	A	A	A	A
LACTIC ACID	A	A*	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
LEAD ACETATE	A	A	A*	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
LUBRICATING OIL	A	A	A*	C	X	A*	A	A	A	A	C	A	A	A	A	A	A	A	A	A
MAGNESIUM CHLORIDE	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A*	A	A	A
MAGNESIUM NITRATE	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
MAGNESIUM SULFATE	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
MALEIC ACID	X	A	A	A	X	A	A	A	X	A	A	A	X	A	A	A	A	A	A	A
METHYL CHLORIDE	A*	C	C	C	C	C	C	A*	A	C	A	C	X	A	A	A	A	A	A	A
METHYL ETHYL KETONE	A	A	A*	C	C	C	A	C	C	C	A	C	X	A	A	A	A	A	A	A
METHYL ISOBUTYL KETONE	A	A	A*	X	C	C	A	X	C	C	A	C	X	A	A	A	A	A	A	A
METHYLENE CHLORIDE	A*	C	C	C	C	A*	A	C	C	C	C	A	C	X	A	A	A	A	A	A
NAPHTHA	A	A	A	C	X	C	A	X	C	C	C	A	A	A	A	A	A	A	A	A
NAPHTHALENE	A	A	C	A	X	C	A	C	A	C	A	C	A	X	A	A	A	A	A	A
NICKEL CHLORIDE	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
NICKEL SULFATE	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
NITRIC ACID, 10%	A	A*	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A*	A	A
NITRIC ACID, 20%	A*	C	A	A	A	A	A	A	A	C	C	A	C	A	A	A	A	A*	A	A
NITRIC ACID, 40%	A*	C	A*	A	C	A	A	A	A	C	C	C	C	A	A	A	A	C	A	A
NITRIC ACID, ANHYDR.	X	C	C	C	C	C	A	A	A	C	C	C	C	A	A	A	A*	C	A	A
NITRO BENZENE	A	A	A	C	C	C	A	A	A	C	C	C	C	A	A	A	A	A	A	A
OIL AND FATS	A	A	A	A	X	A	A	X	A	A	A	A	A	A	A	A	A	A	A	A
OLEIC ACID	A	A	A*	A	A	A	A	X	C	A	A	A	A	A	A	A	X	A	A	A
OLEUM	A*	C	C	C	C	C	A	A	A	C	C	A	X	A	X	X	A	A	A	A
OXALIC ACID	A*	C	A	A	A	A	A	A	A	C	C	A	A*	A	A*	A*	A	A	A	A
PERCHLOROETHYLENE	A*	A*	C	X	C	C	A	X	C	C	C	A	C	A	A	A	A	A	A	A
PHENOL	A	C	A	X	C	A*	A	A	A	C	A	A	X	A	A	A	A	A	A	A
PHOSPHORIC ACID, 0-80%	A	A*	A	A	A	A	A	A	A	A	A	A	X	A	A	A	A	A	A	A
PHOSPHORIC ACID, 80-100%	A	C	A	A	A	A	A	A	A	A	A	A	X	A	A*	A	A	A	A	A
POTASSIUM BICARBONATE	X	A	A	A	A	A	A	X	A	A	X	A	A	A	A	A	A	A	A	A
POTASSIUM BROMIDE	A	A	A	A	A	A	A	X	A	A	X	A	A	A	A	A	A	A	A	A
POTASSIUM CARBONATE	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
POTASSIUM CHLORATE	A	A	A	A	A	A	A	A	A	A	X	A	A	X	A	A	A	A	A	A
POTASSIUM CHLORIDE	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
POTASSIUM CYANIDE	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
POTASSIUM DICHROMATE	A	C	A	A	A	A	A	X	A	A	A	A	A	A	A	A	A	C	A	A*
POTASSIUM HYDROXIDE	A	C	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	X	A
POTASSIUM NITRATE	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A

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HAND PUMP

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ELBOWS

STRAINERS

PLASTIC PIPE NIPPLES

CHEMICAL

	PLASTICS			ELASTOMERS				METALS			MECHANICAL SEALS									
	RYTON (FRP)**	Polyester (FRP)**	Polypropylene (FRP)**	Noryl (FRP)**	PVC	HALAR	Cross Linked Polyethylene	UHMW Polyethylene	Buna-N	EPDM	Nylon	Cork-Nitrile	Hastelloy C	Titanium	316 Stainless Steel	Carbon	Ceramic	Siliconized Graphite		
SELF-PRIMING CENTRIFUGAL	H.I.V	H.I.V				B					O	O	O		S,F	F,R	S,F,R	S	S	S
END-SUCTION CENTRIFUGAL		H.I.V				H.I.V					O	O	O		S,F	F,R	S,F,R	S	S	S
HAND PUMP	H	HTD AE					T,U	ADE H	U	T		OG	OG	G			R,F			
QUICK CONNECT COUPLINGS																				
ELBOWS												G	G	G				F		
STRAINERS																				
PLASTIC PIPE NIPPLES																				
CHEMICAL																				
POTASSIUM PERMANGANATE	A	C	A	A	A	A	A	A	X	A	A	X	A	A	A	A	A	A	A	A
POTASSIUM SULFATE	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
SOAPS (NEUTRAL)	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
SODIUM ACETATE	A	A	A	A	A	A	A	A	A	A	C	A	C	X	A	A	A	A	A	A
SODIUM BICARBONATE	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
SODIUM BISULFATE	X	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
SODIUM BISULFITE	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
SODIUM CARBONATE, 10%	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
SODIUM CHLORATE	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
SODIUM CHLORIDE	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
SODIUM CYANIDE	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
SODIUM HYDROXIDE, 20%	A	C	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
SODIUM HYDROXIDE, 50%	A	C	A	A	A	A	A	A	A	A	A	C	A	C	A	A	A	A	C	A
SODIUM HYPOCHLORITE	A	C	A	A	A	A	A	A	X	A	C	A	A	X	A	A	A	C	C	A
SODIUM NITRATE	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	C	C	A
SODIUM SILICATE	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	X	A	A	A	A
SODIUM SULFATE	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	X	A	A	A	A
SODIUM SULFIDE	A	A	A	A	A	A	A	A	A	A	C	A	A	A	X	A	A	A	A	A
STANNIC CHLORIDE	A	C	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	C	A	A
STEARIC ACID	X	A	A	A	A	X	A	A	A	A	A	A	A	A	A	A	A	A	A	A
STODDARDS SOLVENT	A	A	X	A	C	C	A	X	A	A	C	A	A	A	A	A	A	A	X	A
SULFURIC ACID 0-29%	A	A	A	A	A	A	A	A	A	A	C	A	C	A	A	A	A	A	A	A
SULFURIC ACID 30-95%	A	C	A	A	A	A	A	A	A	A	C	C	A	C	A	C	C	A	A	A
SULFURIC ACID 96-100%	C	C	A	X	A	A	A	A	A	A	C	C	A	C	A	C	F	X	A	A
TANNIC ACID	A	C	A	A	X	A	A	A	A	A	C	A	A	A	A	A	A	A	A	A
TANNING LIQUORS	X	X	A	A	X	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
TARTARIC ACID	A	A	A	A	A	A	A	A	X	A	C	A	A	X	A	A	A	A	A	A
TETRACHLOROETHANE	X	C	C	X	C	C	X	X	X	C	C	A	C	A	C	A	A	A	A	A
TETRAHYDROFURANE	A	A	A	C	C	C	C	X	X	C	C	A	C	X	A	X	A	A	A	A
TOLUENE (TOLUOL)	A	C	A	C	C	C	A	A	A	C	C	C	C	A	A	A	A	A	A	A
(1,1,1) TRICHLOROETHANE	A	C	A	C	C	C	X	A	X	C	C	A	C	A	A	A	A	A	A	A
TRICHLOROETHYLENE	A	C	A	C	C	C	A	A	A	A	C	C	A	C	A	A	A	A	A	A
TRICRESYLPHOSPHATE	X	X	X	A	X	C	C	X	A	C	C	A	A	C	A	X	A	A	A	A
TURPENTINE	A	A	C	C	X	A	A	A	A	A	C	C	A	A	X	A	A	A	A	A
UREA	A	C	A	A	X	A	A	A	A	A	C	C	A	A	X	A	A	A	A	A
VINEGAR	A	A	A	A	A	A	A	A	X	A	C	X	C	X	A	A	A	A	A	A
WHITE LIQUOR (ACID)	X	X	X	X	A	A	A	X	C	A	X	A	A	A	A	X	A	A	A	A
XYLENE (XYLOL)	A	C	C	C	C	C	A	A	A	C	C	A	A	A	A	X	A	A	A	A
ZINC CHLORIDE	A	C	A	A	A	A	A	A	A	A	C	C	A	A	A	X	A	A	A	A
ZINC SULFATE	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A

*For use in applications where the temperature does not exceed 80° F.
 **FRP = Fiberglass Reinforced Plastic



WARRANTY

OMEGA warrants this unit to be free of defects in materials and workmanship and to give satisfactory service for a period of **13 months** from date of purchase. OMEGA Warranty adds an additional one (1) month grace period to the normal **one (1) year product warranty** to cover handling and shipping time. This ensures that our customers receive maximum coverage on each product. If the unit should malfunction, it must be returned to the factory for evaluation. Our Customer Service Department will issue an Authorized Return (AR) number immediately upon phone or written request. Upon examination by OMEGA, if the unit is found to be defective it will be repaired or replaced at no charge. However, this WARRANTY is VOID if the unit shows evidence of having been tampered with or shows evidence of being damaged as a result of excessive corrosion; or current, heat, moisture or vibration; improper specification; misapplication; misuse or other operating conditions outside of OMEGA's control. Components which wear or which are damaged by misuse are not warranted. These include contact points, fuses, and triacs.

We are glad to offer suggestions on the use of our various products. Nevertheless, OMEGA only warrants that the parts manufactured by it will be as specified and free of defects.

OMEGA MAKES NO OTHER WARRANTIES OR REPRESENTATIONS OF ANY KIND WHATSOEVER, EXPRESSED OR IMPLIED, EXCEPT THAT OF TITLE AND ALL IMPLIED WARRANTIES INCLUDING ANY WARRANTY OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE HEREBY DISCLAIMED.

LIMITATION OF LIABILITY: The remedies of buyer set forth herein are exclusive and the total liability of OMEGA with respect to this order, whether based on contract, warranty, negligence, indemnification, strict liability or otherwise, shall not exceed the purchase price of the component upon which liability is based. In no event shall OMEGA be liable for consequential, incidental or special damages.

Every precaution for accuracy has been taken in the preparation of this manual; however, OMEGA ENGINEERING, INC. neither assumes responsibility for any omissions or errors that may appear nor assumes liability for any damages that result from the use of the products in accordance with the information contained in the manual.

SPECIAL CONDITION: Should this equipment be used in or with any nuclear installation or activity, buyer will indemnify OMEGA and hold OMEGA harmless from any liability or damage whatsoever arising out of the use of the equipment in such a manner.

RETURN REQUESTS / INQUIRIES

Direct all warranty and repair requests/inquiries to the OMEGA ENGINEERING Customer Service Department. Call toll free in the USA and Canada: 1-800-622-2378, FAX: 203-359-7811; International: 203-359-1660, FAX: 203-359-7807.

BEFORE RETURNING ANY PRODUCT(S) TO OMEGA, YOU MUST OBTAIN AN AUTHORIZED RETURN (AR) NUMBER FROM OUR CUSTOMER SERVICE DEPARTMENT (IN ORDER TO AVOID PROCESSING DELAYS). The assigned AR number should then be marked on the outside of the return package and on any correspondence.

FOR **WARRANTY** RETURNS, please have the following information available BEFORE contacting OMEGA:

1. P.O. number under which the product was PURCHASED,
2. Model and serial number of the product under warranty, and
3. Repair instructions and/or specific problems you are having with the product.

FOR **NON-WARRANTY** REPAIRS OR **CALIBRATION**, consult OMEGA for current repair/calibration charges. Have the following information available BEFORE contacting OMEGA:

1. Your P.O. number to cover the COST of the repair/calibration,
2. Model and serial number of product, and
3. Repair instructions and/or specific problems you are having with the product.

OMEGA's policy is to make running changes, not model changes, whenever an improvement is possible. This affords our customers the latest in technology and engineering.

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